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TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

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INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP00/08832	**September 9, 2000**	**September 10, 1999**

TITLE OF INVENTION: **METHOD FOR PRODUCING A TABLET MADE OF ISOMALTULOSE, ISOMALT OR ISOMALT VARIANTS**

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Applicants herewith submit to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c)(2)).
   a. ☒ is attached hereto (required only if not communicated by the International Bureau.
   b. ☐ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed with the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371 (c)(2)).
   a. ☒ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154 (d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3)).
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☒ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. ☐ Information Disclosure Statement under 37 CFR 1.97 and 1.98
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☐ A FIRST preliminary amendment.
14. ☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☐ A Substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821-1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154 (d)(4).
19. ☐ A second copy of the English language translation of the international application 35 U.S.C. 154 (d)(4).
20. ☒ Other items or information:
   a. ☒ Copy of cover page of International Publication No. **WO 01/19401**.
   b. ☐ Copy of Notification of Missing Requirements.
   c. ☒ Verification of Translation (2 pages).

U.S. APPLICATION NO (If known, see 37CFR 1.5) 10/070661	INTERNATIONAL APPLICATION NO. PCT/EP00/08832	ATTORNEY'S DOCKET NUMBER. 05638.0017

21. ☒ The following fees are submitted:

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):

	CALCULATIONS PTO USE ONLY
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO **$1040.00**	
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **$890.00**	
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search fee (37 CFR 1.445(a)(2)) paid to USPTO **$740.00**	
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$710.00**	
International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33 (1)-(4) **$100.00**	
ENTER APPROPRIATE BASIC FEE AMOUNT =	$890.00
Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).	$

CLAIMS	NUMBER FILED		NUMBER EXTRA	RATE	
Total Claims	18	- 20 =	0	x $18.00	$
Independent Claims	1	-3 =	0	x $84.00	$
☒ MULTIPLE DEPENDENT CLAIM(S) (if applicable)				+$280.00	$280.00

TOTAL OF THE ABOVE CALCULATIONS =	$1170.00
☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by ½.	$
SUBTOTAL =	$1170.00
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest priority date (37 CFR 1.492(f)).	$
TOTAL NATIONAL FEE =	$1170.00
Fee for recording the enclosed assignment (37 CFR 1.21 (h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property. +	$
TOTAL FEES ENCLOSED =	$1170.00
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a. ☒ A check in the amount of $ 1170.00 to cover the above fees is enclosed.

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NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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In cooperation with
Shanghai Hua Dong Patent Agency
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Patent Application

Improved Compressed Products

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Description

The present invention relates to a method of producing a compressed product of isomaltulose, isomalt and mixtures containing 1,6-GPS and 1,1-GPM, which are characterized by quantity ratios of 1,1-GPM to 1,6-GPS which differ from those of isomalt and/or which contain additional sugar alcohols, as well as the compressed products produced by this method.

Compressed products are foods, drugs, or semi-luxury items consisting of compressed ingredients. Compressed products accordingly generally contain a carrier or diluent, binders, lubricants or parting compounds as well as the active ingredients plus flavorings, pharmaceutical substances or sweeteners. Sucrose, lactose, glucose, starch or mannitol is often used as the carrier or diluent.

European Patent 0 028 905 B1 discloses tablets containing isomaltulose and methods of producing the same. This publication discloses an advantageous use of isomaltulose as a diluent for production of compressed products, because isomaltulose can be pressed directly without the use of a binder and without controlled granulation. According to this publication, crystalline isomaltulose produced directly by enzymatic conversion of sucrose to isomaltulose is used for tabletting.

German Patent 196 39 343 C2 discloses compressed products containing isomalt and isomalt variants. These compressed products are produced by simple pressing of the individual ingredients without a special mechanical and/or chemical treatment of the individual ingredients.

European Patent Application 0 625 578 A1 discloses isomalt variants, but they are not compressed products containing these sweeteners.

The compressed products containing isomaltulose, isomalt and isomalt variants known from the related art are all characterized by the required use of comparatively high compression pressures in production of the compressed product, but only a comparatively low tablet hardness can be achieved. In addition, the state-of-the art compressed products could also be improved with regard to their sensory properties; for example, they have a roughness when bitten into, and their fracture properties are not advantageous; furthermore, the dissolving properties in the mouth should also be improved.

The technical problem on which the present invention is based thus consists of a method of producing compressed products of isomaltulose, isomalt or mixtures containing 1,6-GPS and 1,1-GPM which are characterized by quantity ratios of 1,1-GMP to 1,6-GPS which differ from those of isomalt and/or contain other sugar alcohols and which overcome the disadvantages mentioned above, especially producing compressed products having a great hardness, improved sensory properties and improved fracture properties while using the lowest possible compression pressures.

The present invention solves the basic problem on which it is based by providing a method of producing a compressed product of isomaltulose, isomalt or mixtures containing 1,6-GPS and 1,1-GPM, characterized by quantity ratios of 1,1-GPM to 1,6-GPS which differ from those of isomalt and/or they contain other sugar alcohols, whereby in a first process step, the isomaltulose, the isomalt and/or the mixture containing 1,6-GPS and 1,1-GPM and having a maximum particle diameter d_{90} of 100 μm (d_{90} = 90% of the particles have the required diameter) is obtained or separated, and in a third process step, the separated ground fraction is agglomerated with the addition of a liquid binder, and then in a fourth process step the agglomerate is pressed to form a compressed product. The invention also solves the technical problem on which it is based by providing a compressed product and an agglomerate produced according to the present invention.

This invention thus provides for a compressed product to be produced from one or more of the educts isomaltulose, isomalt or mixtures containing 1,6-GPS and 1,1-GPM, which are characterized by quantity ratios of 1,1-GPM to 1,6-GPS which differ from those of isomalt and/or they contain other sugar alcohols; this is accomplished by dry milling one or more of the educts, whereby either after or during the milling, a fraction is separated and obtained whose maximum particle size is 100 μm. The adjustment of the primary particle size distribution according to this invention proves to be extremely important. Milling is preferably carried out in an air separation ball mill or a combination of a mill and a downstream air classifier. The ...

present invention may be a tablet, for example. The compressed products may contain additives and auxiliary substances such as lubricants, binders, diluents and flavorings, taste substances, parting compounds, coloring agents, acidifying agents, vitamins, functional foods, sweeteners and/or pharmaceutical substances.

In conjunction with the present invention, isomalt is understood to refer to an almost equimolar mixture of the two stereoisomers 6-O-α-D-glucopyranosyl-D-sorbitol (1,6-GPS) and 1-O-α-D-glucopyranosyl-D-mannitol (1,1-GPM), which is also known by the brand name Palatinit®. The term isomalt variant is understood to refer to mixtures containing 1,6-GPS and 1,1-GPM, which are characterized by quantity ratios of 1,1-GPM to 1,6-GPS, which differ from the quantity ratios of isomalt and/or contain other sugar alcohols such as 1,1-GPS (1-O-α-D-glucopyranosyl-D-sorbitol). Such mixtures are disclosed in European Patent Application 0 625 578 A1, for example, which is thus included in the disclosure content of the present patent application with regard to the quantitative and qualitative composition of sugar alcohol mixtures containing 1,1-GPM and 1,6-GPS and methods of producing the same. Therefore, the isomalt variants may be, for example, mixtures of 10 wt% to 50 wt% 1,6-GPS, 2 wt% to 20 wt% 1,1-GPS and 30 wt% to 70 wt% 1,1-GPM, or mixtures of 5 wt% to 10 wt% 1,6-GPS, 30 wt% to 40 wt% 1,1-GPS and 45 wt% to 60 wt% 1,1-GPM. According to the preceding discussion, isomalt variants may also be mixtures enriched with 1,6-GPS or 1,1-GPM, i.e., mixtures such as those described in German Patent 195 32 396 C2, which are also included in the disclosure content of the present patent application with regard to the quantitative and qualitative composition of the mixtures described there and methods of producing the same. Mixtures enriched with 1,6-GPS are characterized by a 1,6-GPS content of 57 wt% to 99 wt% and a 1,1-GPM content of 43 wt% to 1 wt%, while mixtures containing 1,1-GPM are characterized by a 1,6-GPS content of 1 wt% to 43

foods, sweeteners and/or pharmaceutical substances contain [...]

In conjunction with the present invention, isomalt is understood to refer to an almost equimolar mixture of the two stereoisomers 6-O-α-D-glucopyranosyl-D-sorbitol (1,6-GPS) and 1-O-α-D-glucopyranosyl-D-mannitol (1,1-GPM), which is also known by the brand name Palatinit®. Mixtures containing 1,6-GPS and 1,1-GPM, which are characterized by quantity ratios of 1,1-GPM to 1,6-GPS which differ from the quantity ratios of isomalt and/or contain other sugar alcohols such as 1,1-GPS (1-O-α-D-glucopyranosyl-D-sorbitol) and are also referred to as isomalt variants, are described, for example, in European Patent Application 0 625 578 A1, which is thus included in the disclosure content of the present patent application with regard to the quantitative and qualitative composition of sugar alcohol mixtures containing 1,1-GPM and 1,6-GPS and methods of producing them. Therefore, such mixtures may be, for example, mixtures of 10 wt% to 50 wt% 1,6-GPS, 2 wt% to 20 wt% 1,1-GPS and 30 wt% to 70 wt% 1,1-GPM, or mixtures of 5 wt% to 10 wt% 1,6-GPS, 30 wt% to 40 wt% 1,1-GPS and 45 wt% to 60 wt% 1,1-GPM. According to the preceding discussion, such mixtures may also be mixtures enriched with 1,6-GPS or 1,1-GPM, i.e., mixtures such as those described in German Patent 195 32 396 C2, which are also included in the disclosure content of the present patent application with regard to the quantitative and qualitative composition of the mixtures described there and methods of producing the same. Mixtures enriched with 1,6-GPS are characterized

by a 1,6-GPS content of 57 wt% to 99 wt% and a 1,1-GPM content of 43 wt% to 1 wt%, while mixtures containing 1,1-GPM are characterized by a 1,6-GPS content of 1 wt% to 43 wt% and a 1,1-GPM content of 57 wt% to 99 wt%. The mixtures containing 1,6-GPS and 1,1-GPM mentioned above may also contain other substances such as mannitol, sorbitol, hydrogenated or non-hydrogenated oligosaccharides as well as optionally glucose, fructose and/or sucrose, trehalulose or isomaltose.

This invention thus provides that according to a first procedure step the educt, namely isomaltulose, isomalt and/or the mixtures containing 1,6-GPS and 1,1-GPM, is milled while dry. In a preferred embodiment of this invention, this can take place in an air separation ball mill or a combination of a mill and a downstream air classifier. This invention also proposes that the educts used be adjusted to the required particle size by measures other than milling, e.g., by crushing. Additives and auxiliary substances may be added in milling, preferably in an amount of up to 30 wt% (based on total dry solids).

In a second process step which takes place essentially concurrently or subsequently following milling, this invention provides for the fraction to be separated and for further processing to be performed, where the particles contained in this fraction should have a maximum size of 100 μm, preferably less than 50 μm, especially having a maximum size of 40 μm,

°Celsius, into the fluidized bed. Depending on the binder used, the temperature of the binder should be selected so that the binder is sprayable, i.e., the temperature is at or above the melting point of the binder. Following agglomeration, in another preferred embodiment of this invention, drying may be performed; in another preferred embodiment, the drying is performed at a constant incoming air temperature, e.g., 70 °Celsius to 90 °Celsius, especially preferably 80 °Celsius. In another preferred embodiment, the drying may be carried out at an exhaust air temperature up to 50 °Celsius to 70 °Celsius, preferably 60 °Celsius, with product cooling preferably being accomplished with outside air.

This invention of course also relates to the agglomerates themselves produced as described above.

In another advantageous embodiment of the present teaching, this invention provides for a size fractionation to be performed on the agglomerated products after adding the binder and agglomerating but before pressing the agglomerate, especially by separating oversized particles and fines. A screen machine preferably with a screen lining of 0.8 mm to 0.1 mm may preferably be provided.

In a fourth process step according to this invention, the agglomerated product, optionally fractionated after agglomeration, is pressed directly. Additives or auxiliary substances such as lubricants or parting compounds, active ingredients, etc. may be added to the agglomerates. Such substances may include sweeteners, flavorings, taste substances and coloring agents, food-compatible acids, disintegrants, monosaccharides, disaccharides, monosaccharide alcohols, disaccharide alcohols, starch, starch derivatives, pectin, polyvinylpyrrolidone, cellulose, cellulose derivatives, stearic

acid or the salts thereof, or inulin, oligofructose or other products such as functional foods, which may be offered accordingly. Sorbitol, mannitol, hydrogenated or non-hydrogenated oligosaccharides, erythritol, xylitol or sugars such as sucrose, glucose, lactose, fructose or xylose may also be added to the agglomerates. In an advantageous manner, the amount of these substances, based on the total dry weight, is less than or equal to 30 wt%, preferably less than 25 wt%, 20 wt%, 15 wt%, 10 wt% or 5 wt%. These additives and auxiliary substances may of course also be added to the educts during milling. In another embodiment, the components mentioned above, such as additives or auxiliary substances, e.g., erythritol, may also be ground dry together with the isomaltulose, isomalt and/or isomalt variant and then treated further according to this invention. In another embodiment of the present invention, the above-mentioned additives or auxiliary substances such as erythritol may be dissolved in a solvent, such as water, and sprayed into the ground fraction during the agglomeration of the ground isomaltulose, isomalt and/or isomalt variant, so that introduction of the dissolved additives or auxiliary substances takes place during the agglomeration process. Finally, in a third embodiment of this invention, these additives or auxiliary substances may be mixed with the agglomerated fraction and pressed to form a compressed product.

In an especially advantageous embodiment, the compressed products produced according to this invention are sugar-free. In another embodiment, the compressed products or agglomerates may also be xylitol-free. In another preferred embodiment, the compressed products according to this invention may be reduced-calorie products, suitable for diabetics, anti-lipidemic, bi-fidogenic and/or non-cariogenic.

Furthermore, the agglomerates or educts may also contain intense sweeteners such as dipeptide sweeteners, saccharine, acesulfame

K, aspartame, cyclamate, glycyrrhizine, thaumatin, saccharin, steveoside, neohesperidin dihydrochalcone and/or sucralose.

In an advantageous manner, the compressed products according to this invention also contain taste or flavoring substances such as lemon flavoring or peppermint flavoring. The compressed products according to this invention may also contain food-compatible acids such as ascorbic acid or citric acid and also fatty acids or their salts such as magnesium stearate or sodium stearate as lubricants. Finally, the compressed products according to this invention may also contain coloring agents and/or disintegrants such as bicarbonate or carboxymethylcellulose.

In an especially preferred embodiment, the compressed products that are produced can introduce active pharmaceutical ingredients into the mouth and throat area and release them there. In conjunction with the present invention, active pharmaceutical ingredients are understood to refer to substances that have a desired prophylactic or therapeutic effect on the human or animal body. These substances are thus used in particular to prevent or treat deficiency states or disease syndromes. According to this invention, for example, enzymes, coenzymes, minerals, vitamins, antibiotics, microbicidal or fungicidal substances, nicotine, caffeine, zinc, eucalyptus, menthol, codeine, phenacetin, aspirin or other active pharmaceutical substances may be incorporated into the compressed products. The active pharmaceutical ingredients are to be provided in an amount that will have the desired pharmaceutical effect. The processability of the compressed products under gentle conditions makes the compressed products according to this invention especially suitable for introducing active pharmaceutical ingredients into the mouth and throat area.

This invention also relates to the compressed products produced by the method according to this invention, especially in the form of lozenges, chewable tablets or effervescent tablets.

Other advantageous embodiments of this invention are derived from the subclaims.

The following examples are presented to illustrate this invention in detail.

The figures show:

Figure 1 a comparison of the breaking force between compressed products of isomalt ST (type FE, not agglomerated), isomalt ST (agglomerated) and isomalt GS (agglomerated),

Figure 2 a comparison of the breaking force between compressed products of isomalt ST and isomalt GS, and

Figure 3 breaking force information on compressed products containing isomaltulose.

Example 1: Production of compressed products

Isomalt ST (standard, an almost equimolar mixture of 1,1-GPM and 1,6-GPS) was milled dry in an air separation ball mill to a particle size of d_{90} = 50 μm. The same procedure was followed with isomalt GS (composition approx. 76% 1,6-GPS and 23% 1,1-GPM) and isomaltulose. Isomalt ST type FE (like isomalt ST, but not agglomerated, particle size 60 μm to 300 μm) was used as the control.

To prepare the agglomerates, a fluidized bed agglomerator, namely the STREA 7 agglomerator from Aeromatic, was used in a

batch-type process. The experimental batches each amounted to 10 kg. The ground bulk material was placed in the fluidized bed agglomerator and a fluidized bed was established at approx. 60°C. On reaching this temperature, a binder solution at approx. 75°C was sprayed into the fluidized bed, using either 3 wt% collidone or 0.8 wt% gelatin (130 Bloom) and 0.5 wt% fat. The spray pressure used was between 2.0 and 4.5 bar, with an admission pressure of 0.4 to 0.8 bar being used. Then the agglomerates that were formed were dried at a constant incoming air temperature of approx. 80 °Celsius up to an exhaust air temperature of approx. 60 °Celsius, followed by cooling of the product with outside air. Then size fractionation was performed with an oscillating screening machine with a screen lining of 0.8 mm to 0.1 mm, separating the oversized particles and the fines. Agglomerate fractions with a particle diameter of ≥0.1 mm to ≤0.8 mm were then used further to produce the compressed products after adding flavorings, intense sweeteners and parting compounds according to the following recipe.

Recipe:

Isomalt, isomalt variant (GS) or isomaltulose agglomerate	98.40%
Mg stearate	0.50%
Natural lemon flavor	0.50%
Citric acid (mono)	0.30%
Acesulfame K	0.15%
Aspartame	0.15%

All the amounts are given in wt%, based on the total dry weight of the compressed product.

The following table shows physicochemical parameters of the compressed product mixtures used here.

Recipe	Water content	d_{05}	d_{95}	d'	n	Bulk density	Tamped density	Flow time
	%	mm	mm	mm		g/cm^3	g/cm^3	S
Isomalt ST (K)	4.1	0.53	0.07	0.31	2.01	0.44	0.45	23.0
Isomalt ST (G-F)	3.9	0.53	0.06	0.3	1.88	0.51	0.52	24.7
Isomalt GS (K)	1.9	0.53	0.06	0.3	1.92	0.42	0.42	24.6
Isomalt GS (G-F)	1.4	0.7	0.09	0.4	1.94	0.53	0.54	18.9
Isomaltulose (K)	5.1	0.53	0.04	0.26	1.55	0.44	0.45	22.8

Table: (K: collidone 30; G-F: gelatin fat)

The pourability and the flow time were determined according to DIN 53194 and DIN 53492.

Type of nozzle for determining pourability:
10 mm diameter

The bulk density and tamped [density] were determined according to DIN 53194.

The mixtures defined above for the compressed product experiments were produced in the ploughshare mixer from Lödige. The mixing time was 1.5 minutes. The individual ingredients were added through an opening in the cover flap on the mixer. After

conclusion of the mixing operation, the mixtures were poured into PE bags of 5 kg each and sealed.

Round tablets having a diameter of 18 mm and facets, a web height of 0.35 to 0.37 mm and a weight between 850 mg and 1000 mg were then produced with the resulting mixtures by using a Fette PT 2090 rotary press.

Example 2: Comparison of the breaking force

Figure 1 shows a breaking force comparison between compressed products made of isomalt ST (K and G-F) and agglomerated isomalt GS (K and G-F). For comparison, a compressed product of isomalt ST type FE is also shown; it was produced from a fraction of particles with a particle diameter of 60 μm to 300 μm. The compressed products according to this invention were produced with a pressing force of only 40 kN, but they had an extremely high breaking force. (The abbreviations in the figures denote: K 30 = collidone 30, GF = gelatin-fat).

Figure 2 shows a breaking force comparison between isomalt ST and isomalt GS, both in agglomerated form. It can be seen here that there is no significant difference between these two forms of isomalt. In a sensory evaluation, the dissolving properties of the GS variant in the mouth were evaluated as slightly better.

Figure 3 compares compressed products produced on the basis of isomaltulose (same as palatinose). This shows the pressing force, the breaking force and the sensory properties of isomaltulose compressed products produced from a fraction having a particle size of 100 μm and collidone 30. The use of a fraction having particles with a diameter of $\leq$ 100 μm, preferably $\leq$ 50 μm, especially $\leq$ 30 μm, is especially important

in the case of isomaltulose, because isomaltulose fractions with particle sizes > 100 μm show a marked tendency toward a perceptibly rough surface in compression.

The results presented above show that the agglomeration specified according to this invention results in the fact that much lower pressing forces can be used than in the related art to produce tablets with a sufficient breaking force. The mixture with the agglomerates produced in this way leads to improved flowability and a smaller fines fraction, which in turn leads to improved processability and reduced machine wear as well as an increased tabletting output.

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Claims

1. A method of producing a compressed product of isomaltulose, isomalt or mixtures containing 1,6-GPS and 1,1-GPM, which are characterized by quantity ratios of 1,1-GPM to 1,6-GPS which differ from those of isomalt and/or contain other sugar alcohols, wherein

a) the isomaltulose, isomalt and/or the mixture containing 1,6-GPS and 1,1-GPM is ground dry,

b) at the same time or thereafter, a ground fraction of the isomaltulose, the isomalt or the mixture containing 1,6-GPS and 1,1-GPM with a maximum particle diameter of 100 μm is obtained or separated,

c) the ground fraction is agglomerated with the addition of a liquid binder, and

d) then it is compressed to form a compressed product.

2. The method according to Claim 1, wherein the mixture containing 1,6-GPS and 1,1-GPM is a mixture of 10 wt% to 50 wt% 1,6-GPS, 2 wt% to 20 wt% 1,1-GPS and 30 wt% to 70 wt% 1,1-GPM, or a mixture of 5 wt% to 10

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wt% 1,6-GPS, 30 wt% to 40 wt% 1,1-GPS and 45 wt% to 60 wt% 1,1-GPM, or a mixture enriched with 1,6-GPS with a 1,6-GPS content of 57 wt% to 99 wt% and a 1,1-GPM content of 43 wt% to 1 wt% or a mixture enriched with 1,1-GPM with a 1,6-GPS content of 1 wt% to 43 wt% and a 1,1-GPM content of 57 wt% to 99 wt%.

3. The method according to Claim 1 or 2, wherein the particle diameter is ≤ 50 μm.

4. The method according to Claim 1, 2 or 3, wherein the particle diameter is ≤ 30 μm.

5. The method according to one of the preceding claims, wherein the milling is performed in an air separation ball mill or in a combination of a mill and a downstream air classifier.

6. The method according to one of the preceding claims, wherein additives or auxiliary substances are introduced during milling.

7. The method according to one of the preceding claims, wherein the liquid binder is a solution or suspension of isomalt, a mixture containing 1,6-GPS and 1,1-GPM characterized by quantity ratios of 1,1-GPM to 1,6-GPS which differ from those of isomalt, and also containing fat and gelatin or collidone.

8. The method according to one of the preceding claims, wherein the liquid binder is added to the separated ground fraction by spraying.

9. The method according to one of the preceding claims, wherein the liquid binder is added to the separated ground fraction through a nozzle.

10. The method according to one of the preceding claims, wherein agglomeration is performed intermittently in a fluidized-bed agglomerator or in a continuously operated installation.

11. The method according to one of the preceding claims, wherein the liquid binder is added to the separated ground fraction in a form in which it is heated to a temperature above room temperature.

12. The method according to one of the preceding claims, wherein additives and/or flavorings are added to the agglomerate after adding the liquid binder and before pressing.

13. The method according to one of the preceding claims, wherein size fractionation of the agglomerate is performed after adding the liquid binder and before pressing.

14. The method according to one of the preceding claims, wherein the size fractionation of the agglomerate according to Claim 13 is performed in a screening machine.

15. The method according to one of the preceding claims, wherein the agglomerate is dried after agglomeration.

16. A compressed product that can be produced according to one of the preceding claims.

17. An agglomerate that can be produced by process steps a) through c) according to one of Claims 1 through 15.

Abstract

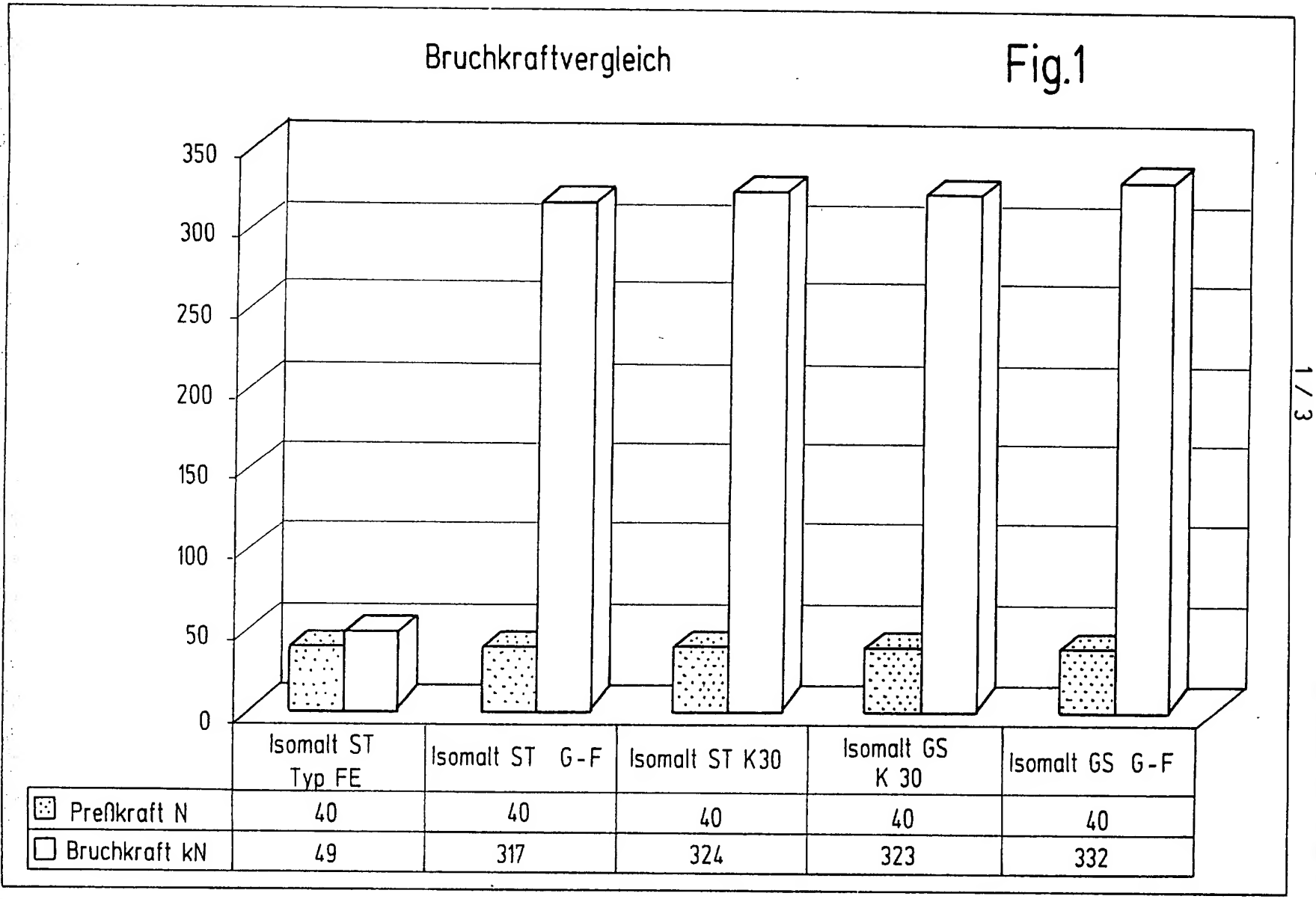
The present invention relates to a method of producing an improved compressed product, wherein agglomeration of the ingredients is induced. This invention also relates to a compressed product produced by this method.

Fig. 1. Comparison of breaking force
Isomalt ST, type FE
Pressing force N
Breaking force kN

Fig. 2. Comparison of breaking force
Pressing force N
Breaking force kN

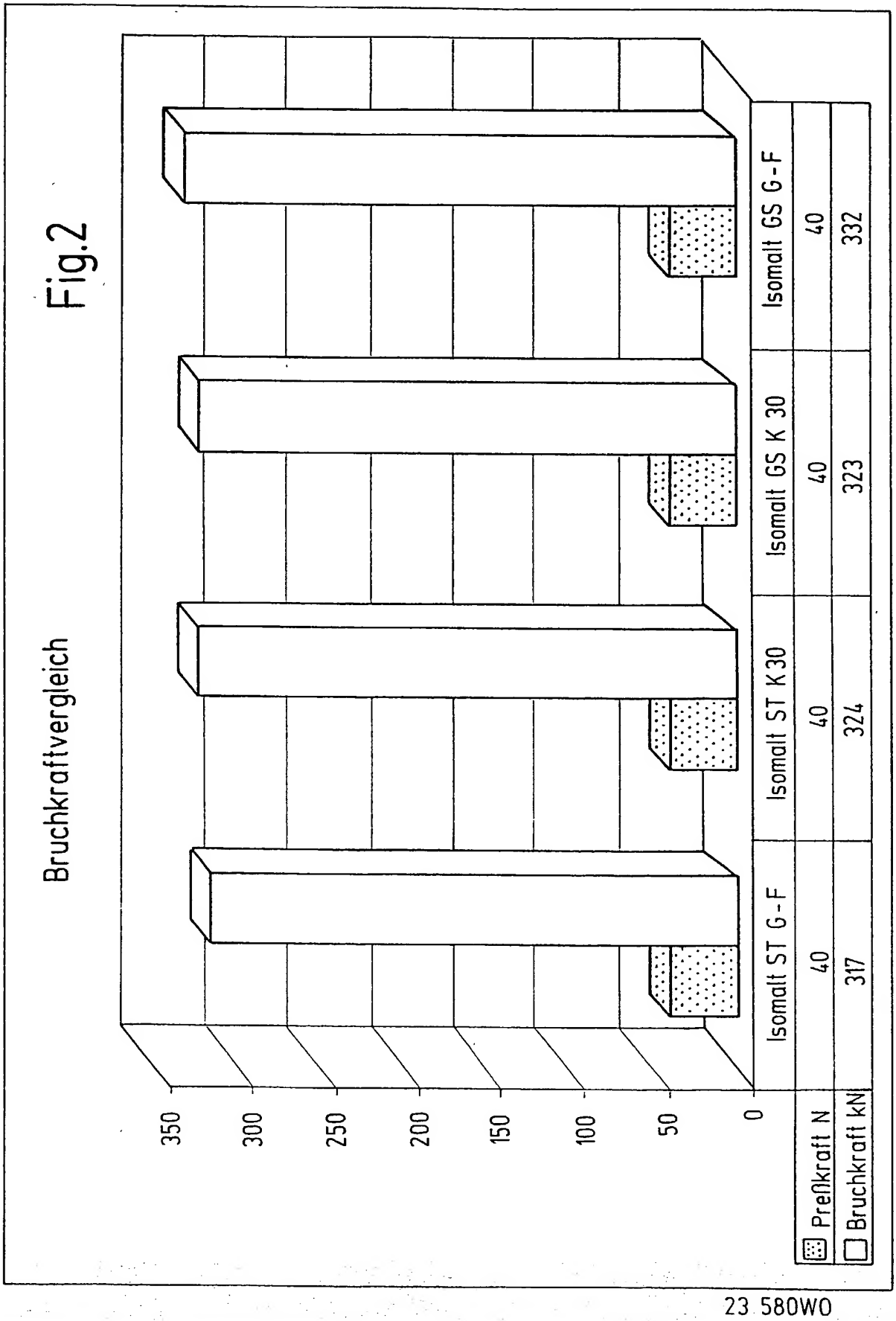
Fig. 3. Palatinose (pressing force (kN), breaking force (N))
Sensory properties: 1 = rough surface, 2 = smooth surface and 3 = very smooth surface
Pressing force N
Breaking force kN
Sensory properties

Fig.1



	Isomalt ST Typ FE	Isomalt ST G-F	Isomalt ST K30	Isomalt GS K 30	Isomalt GS G-F
Preßkraft N	40	40	40	40	40
Bruchkraft kN	49	317	324	323	332

Fig.2



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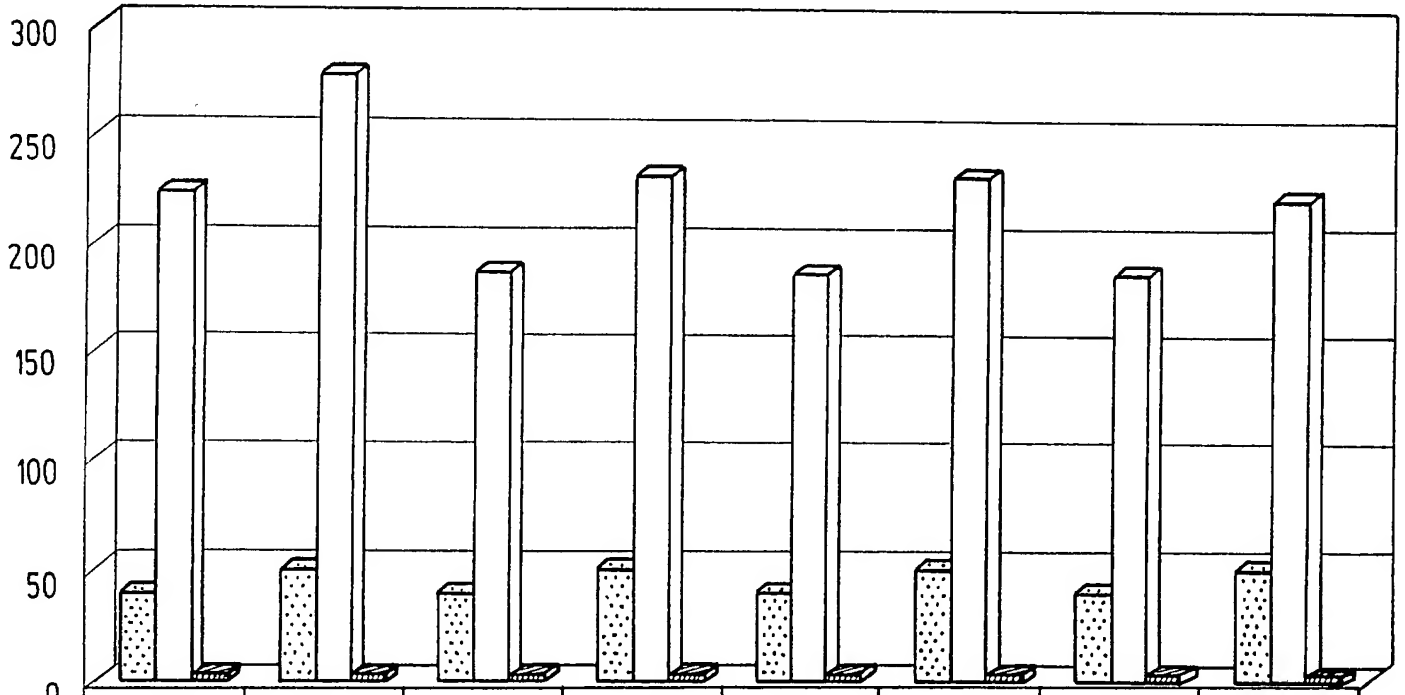
Palatinose (Preßkraft [kN], Bruchkraft [N],
Sensorik: 1 = rauhe Oberfläche, 2 = glatte Oberfläche und
3 = sehr glatte Oberfläche

Fig.3



	30	30	40	40	50	50	100	100
Preßkraft [kN]	40	50	40	50	40	50	40	50
Bruchkraft [N]	224	277	186	231	185	230	185	220.
Sensorik	3	3	3	3	2	3	1	1

10/088261 Customer Number 22,852
24385 US Attorney Docket No.05638.0017

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that: my residence, post office address and citizenship are as stated below next to my name; I believe I am the original, first, and sole inventor (if only one name is listed below) or an original, first, and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

METHOD FOR PRODUCING A TABLET MADE OF ISOMALTULOSE, ISOMALT OR ISOMALT VARIANTS

the specification of which
☐ is attached and/or
☐ was filed on as United States Application Serial No. or
☒ PCT International Application No. PCT/EP00/08832 filed on September 9, 2000, and was amended on October 18, 2001.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate or § 365(a) of any PCT international application(s) designating at least one country other than the United States, listed below and have also identified below, any foreign application(s) for patent or inventor's certificate, or any PCT International application(s) having a filing date before that of the application(s) of which priority is claimed:

Country	Application Number	Date of Filing	Priority Claimed Under 35 U.S.C. 119
Germany	199 43 491.3	September 10, 1999	☒ YES ☐ NO
			☐ YES ☐ NO

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below:

Application Number	Date of Filing

I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s) or § 365(c) of any PCT International application(s) designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application(s) in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application(s) and the national or PCT International filing date of this application:

Application Number	Date of Filing	Status (Patented, Pending, Abandoned)

I hereby appoint the following attorney and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. **FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER, L.L.P., CUSTOMER NUMBER 22,852,** Douglas B. Henderson, Reg. No. 20,291; Ford F. Farabow, Jr., Reg. No. 20,630; Arthur S. Garrett, Reg. No. 20,338; Donald R. Dunner, Reg. No. 19,073; Brian G. Brunsvold, Reg. No. 22,593; Tipton D. Jennings, IV, Reg. No. 20,645; Jerry D. Voight, Reg. No. 23,020; Laurence R. Hefter, Reg. No. 20,827; Kenneth E. Payne, Reg. No. 23,098; Herbert H. Mintz, Reg. No. 26,691; C. Larry O'Rourke, Reg. No. 26,014; Albert J. Santorelli, Reg. No. 22,610; Michael C. Elmer, Reg. No. 25,857; Richard H. Smith, Reg. No. 20,609; Stephen L. Peterson, Reg. No. 26,325; John M. Romary, Reg. No. 26,331; Bruce C. Zotter, Reg. No. 27,680; Dennis P. O'Reilley, Reg. No. 27,932; Allen M. Sokal, Reg. No. 26,695; Robert D. Bajefsky, Reg. No. 25,387; Richard L. Stroup, Reg. No. 28,478; David W. Hill, Reg. No. 28,220; Thomas L. Irving, Reg. No. 28,619; Charles E. Lipsey, Reg. No. 28,165; Thomas W. Winland, Reg. No. 27,605; Basil J. Lewris, Reg. No. 28,818; Martin I. Fuchs, Reg. No. 28,508; E. Robert Yoches, Reg. No. 30,120; Barry W. Graham, Reg. No. 29,924; Susan Haberman Griffen, Reg. No. 30,907; Richard B. Racine, Reg. No. 30,415; Thomas H. Jenkins, Reg. No. 30,857; Robert E. Converse, Jr., Reg. No. 27,432; Clair X. Mullen, Jr., Reg. No. 20,348; Christopher P. Foley, Reg. No. 31,354; John C. Paul, Reg. No. 30,413; Roger D. Taylor,

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

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